Smoking Cessation and Colorectal Cancer: Timing, Other Factors Affect Risk

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Smoking may increase the risk of colorectal cancer (CRC), as may other lifestyle and environmental factors, including high body mass index (BMI), residence in certain countries, and low fruit and vegetable consumption. However, it is less clear how and at what point quitting smoking influences one's subsequent risk of CRC. Similarly other CRC risk factors may interact with smoking in their effect on CRC risk; that is, smoking and some other factor together may lead to an even greater risk than the combined risk of each of the factors separately.

Drs. Jian Gong, Ulrike Peters, and colleagues in the Public Health Sciences Division teamed with other researchers to address these questions using pooled data from the GECCO study (Genetics and Epidemiology of Colorectal Cancer Consortium). The GECCO study includes data on CRC from 8 different studies (some of which were conducted within PHS), and provides greater power for investigating these potential interactions.

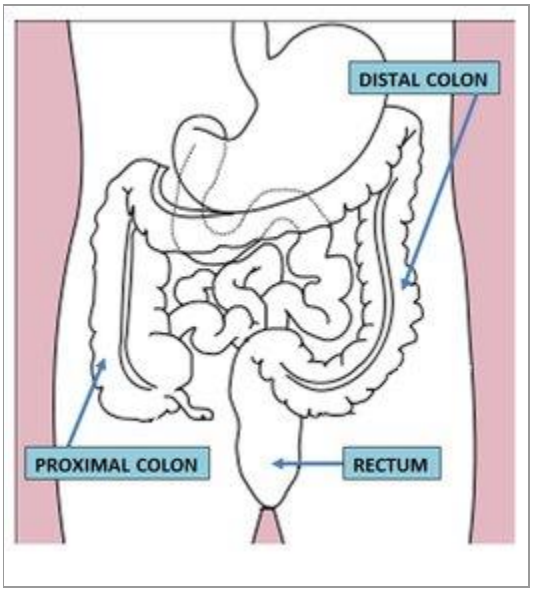
The study included 6,796 cases of invasive CRC and 7,770 controls. Investigators used a 2-step approach, first calculating odds ratios (ORs) and 95% confidence intervals (CIs) independently for each original study, and then conducting a meta-analysis, pooling these results to estimate a summary OR. Authors accounted for possible differences in several factors, including age, sex, BMI, education, alcohol use, and study site by including these factors in the analyses. In addition to estimating the effects of smoking, amount smoked, and time since quitting, they also conducted some analyses separately by CRC site (proximal and distal colon, rectum). To evaluate whether there were interactions between smoking and other factors, they estimated the Relative Excess Risk due to Interaction (RERI). This is the fraction of the excess risk of CRC in smokers and (for example) those with high BMI, which is attributable to the interaction between those two factors (smoking and having high BMI).

They found that persons who smoked currently or previously had a higher risk of CRC than those who had never smoked (OR 1.26, 95% CI 1.11-1.43 for current; OR 1.18, 1.09-1.27 for past). Persons who had quit smoking had a higher risk of CRC than those who had never smoked; this risk was higher for up to 25 years after cessation. Quitting was associated with an immediate reduction in risk of rectal and proximal colon cancer, but a delayed reduction in risk (about 20 years) for distal

colon cancer. There was some evidence of potential interaction between smoking and two other factors: BMI and fruit consumption. Compared to non-smokers with normal BMI, 15% of the excess risk of CRC for overweight (BMI ≥ 25 kg/m2) smokers was due to the interaction between smoking and BMI (RERI: 0.15, 95% CI -0.01-0.31). Similarly, compared to non-smokers with high levels of fruit intake, 16% of the excess risk of CRC in smokers with low fruit intake was due to an interaction between smoking and low fruit intake (RERI: 0.16, 95% CI 0.01-0.30).

This study was consistent with previous findings that smoking increases CRC risk, and provides evidence that quitting smoking is associated with a reduction in risk, though the timing of this reduction in risk may vary considerably.

Gong J, Hutter C, Baron JA, Berndt S, Caan B, Campbell PT, Casey G, Chan AT, Cotterchio M, Fuchs CS, Gallinger S, Giovannucci E, Harrison T, Hayes R, Hsu L, Jiao S, Lin Y, Lindor NM, Newcomb P, Pflugeisen B, Phipps AI, Rohan T, Schoen R, Seminara D, Slattery ML, Stelling D, Thomas F, Warnick G, White E, Potter J, Peters U. 2012. A pooled analysis of smoking and colorectal cancer: timing of exposure and interactions with environmental factors. Cancer Epidemiol Biomarkers Prev. 21(11):1974-85. doi: 10.1158/1055-9965.



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Sites of colorectal cancer: proximal colon, distal colon, rectum